<Case Report>A New Method for Coronary Artery Reconstruction in Patients with Recurrent Aortic Prosthetic Valve Endocarditis and an Inaccessible Coronary Arterial System

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A New Method for Coronary Artery Reconstruction in Patients with Recurrent Aortic Prosthetic Valve Endocarditis and an Inaccessible Coronary Arterial System

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Abstract

A new approach to the problem of recurrent infection of an aortic valve prosthesis in a patient with an inaccessible coronary arterial system is presented. The coronary arteries were reconstructed by anastomosing a looped ringed-PTFE graft to the left and right coronary ostia within the aorta, and the graft was withdrawn from the aorta just above the ostia. Then the top of the looped graft was anastmosed to the aorta above a translocated aortic prosthesis. This procedure is most likely to be useful in the treatment of recurrent aortic prosthetic valve endocarditis which has dense pericardial adhesion secondary to multiple cardiac operations.

Aortic prosthetic valve endocarditis frequently is associated with a paravalvular ring abscess which may destroy the normal annulus. In these cases, translocating the aortic valve to the ascending aorta, and placing saphenous vein bypass grafts to the right and the left anterior descending coronary artery may be required. However, the coronary arteries may not be accesible following multiple operations. The following case illustrates a new solution to the problem how to translocated the aortic valve and reconstruct the coronary arteries in a patient with an infected aortic root and inaccessible coronary arteries.

Case report

A 38-year-old man underwent an uncomplicated aortic valve replacement with Björk-Shiley prosthesis on July 23, 1985, because of aortic regurgitation causing by a bicuspid valve. The postoperative recovery was uneventful.

Twenty-eight months later, the patient was readmitted with fever, a new murmur of aortic regurgitation, and weakness in his left hand. Blood cultures grew Staphylococcus epidermidis. An

Key words: Prosthetic valve endocarditis, Aortic root abscess, Reconstruction of coronary arteries, Translocation of the aortic valve

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echocardiogram showed normal movement of the prosthesis without vegetations. A slight fever persisted despite several courses of different antibiotics, and congestive heart failure subsequently developed. The patient underwent a second aortic valve replacement on December 8, 1987. At surgery, the prosthetic valve was seen to be virtually detached from the aortic root on all sides. The sewing ring was covered by friable granulation tissue, and when the prosthesis was removed, an extensive subannular abscess, which had destroyed the ventricular septum, was uncovered. All nonviable and infected tissue was removed. A No. 29 Saint-Jude-Medical (SJM) valve was sutured to the aortic root using pledgeted horizontal mattress sutures through the ventricular septum from the right ventricular outflow tract and through the aortic wall. Antibiotic therapy was continued, and the patient did well until the 12th postoperative day, when aortic regurgitation again developed. However, the patient remained hemodynamically stable and free from infection. Therefore, he was dischaged without further treatment at that time and followed as a outpatient.

The patient was readmitted in May 1990 because of the gradual onset of congestive heart failure. Cardiac catheterization revealed 3+ paraprosthetic regurgitation. Multiple blood cultures were sterile. The patient's congestive heart failure increased despite intensive medical therapy, and a third operation was performed on June 5, 1990. Aortotomy revealed that three or four of the horizontal mattress sutures which had been used to anchor the annulus of the left coronary sinus had pulled out from the aortic wall. Since no sign of infection was present, primary repair was performed. The paravalvular leakage was repaired using interrupted pledgeted mattress sutures through the aortic wall. Postoperative recovery was uneventful until July 13, the patient became febrile and developed chills. Blood cultures grew methicillin-resistant Staphylococcus aureus (MRSA), which was sensitive only to vancomycin (VCM) and minomycin (MINO). One gram of VCM was administered intravenously every 6 hours, and 100 mg of MINO every 12 hours. On July 17, the patient had a grand mal seizure and became comatose. The leukocyte count rose to 11,500 cells/mm^3, and

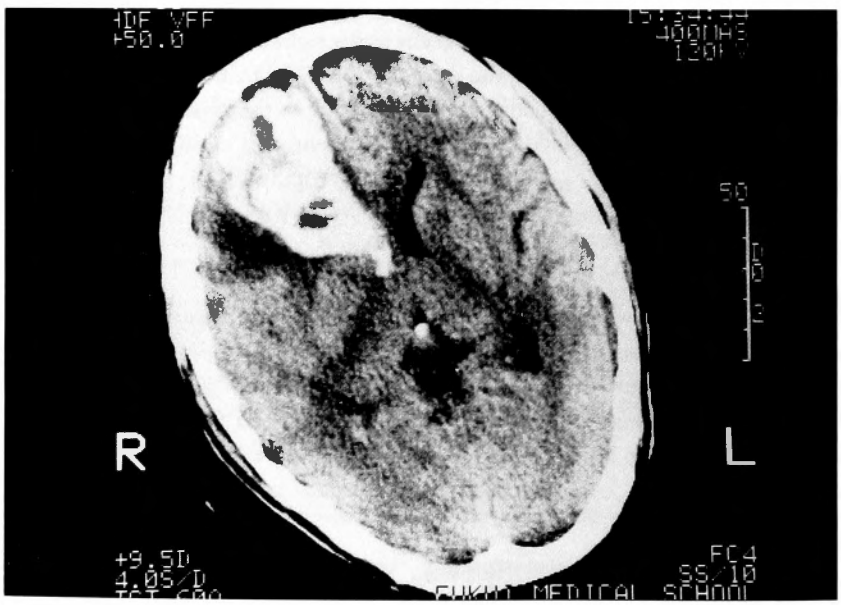

Fig. 1 Cerebral computed tomography, showing hematomas in the right frontal lobe.

the platelet count decreased to 20,000 cells/mm^3 Cerebral computed tomography demonstrated intracranial hematomas due to mycotic aneurysms (Fig. 1). On July 20, craniotomy and drainage of the hematomas was performed. The patient slowly regained his normal mental status.

On September 10, a fourth heart operation was performed. The heart was exposed through a median sternotomy. The epicardium was tightly adhered to the pericardium, and repeated procedures had weakend the ascending aortic wall. Aortotomy revealed that the horizontal mattress sutures which had been placed during the third operation had pulled out. The sewing ring was covered by fragile granulation tissue, and an abscess had replaced the aortic wall in the legion of the left and none coronary sinuses (Fig. 2). Therefore, neither implantation of an aortic prosthesis nor placement of a composite graft in the usual subcoronary position was considered possible. The ascending aortic wall was so fragile that closure of the aortotomy was difficult. Moreover construction of distal anastmosis to the right and the left anterior descending coronary arteries by saphenous vein graft was considered impossible because adhesion obscurred the coronary arterial system. It was decided to reconstruct the coronary arteries with a looped ringed-PTFE graft whose distal ends were sutured to both the left and right coronary ostia within the aorta. The graft was brought out of the aorta just above the coronary anastomosis. A composite graft incorporating a No. 27 SJM valve in a 30 mm woven Dacron graft was sutured to the aorta just distal to the point of exit of the PTFE graft. The top of the looped graft was anastmosed side-to-side to the composite graft above the aortic prosthesis (Fig. 3). The end of the aorta was oversewn using a continuous predgeted suture. Then the other end of the Dacron graft was anastomosed end-to-side to the descending aorta. No further surgical complication arose. He had an early angiographic study showing the translocation of the aortic valve and patent prosthetic coronary bypass graft. He was doing well 30 months postoperatively without heart block or angina.

Fig. 2 Intraoperative photograph: When the prosthesis was removed, an extensive subannular abscess, which had destroyed the left and none coronary sinuses, was uncovered.

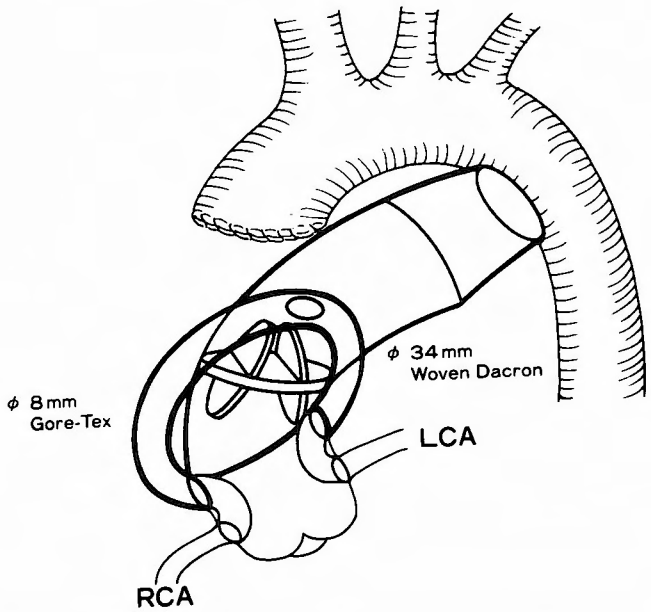

Fig. 3 Illustration of reconstruction: The coronary arteries were reconstructed by anastomosing a looped ringed-PTFE graft to the left and right coronary ostia from within the aorta. The graft was brought out the aorta just above the coronary anastomosis. Then the top of the looped graft was anastmosed side-to-side to the composite graft above a translocated aortic prosthesis.

Comment

The management of patients with infection of the aortic annulus remains difficult, despite the development of some creative techniques. The aotic root replacement with a valved composite graft or the insertion of a valve prosthesis in a supracoronary position in the ascending aorta combined with aorto-coronary bypass has been used for severe forms of destruction of the aortic annulus[1-7]. However, in cases of multiple operations, adhesions often are so dense that the coronary arterial system cannot be isolated. In these cases, it is impossible to anastomose autogenous vein to the coronary arteries. The present case presents a new approach to the treatment of infected aortic root with an inaccessible coronary arterial system. The use of a looped ringed-PTFE graft anastomosed directing the right and left coronary ostia within the aorta obviates the need for isolating a target site on the coronary arteries. The extraanatomic position of the graft is made possible by the interposition of a Dacron graft containing an aortic prosthesis which anastomosed to the aorta just distal to point of exit of the PTFE. An anastomosis can be created as a side-to-side anastomosis between the top of the looped PTFE graft distal to the aortic prosthesis. The other end of the Dacron graft is sutured to the distal end of a native aorta. This method allows eradication of infection because it reduces the amount of synthetic material at the site of infection. Surely, this procedure will be performed infrequently, but it offers the surgeon an attractive alternative in cases of recurrent aortic prosthetic valve endocarditis with dense adhesions.

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和文抄録

4回の開心術による癒着のため冠動脈走行が判別不能であった大動脈弁輪部膿瘍に対するトランスロケーション法における冠動脈再建の新方法

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4回の開心術による癒着のため冠動脈の走行が判別不能であった大動脈弁輪部膿瘍を伴なった感染性心内膜炎症例に対し，冠動脈再建に新しい方法を用いたトランスロケーション法を行った．8 mmφ のリング付き PTFE 人工血管の両端を大動脈の内腔で左右冠動脈孔に縫着し，その直ぐ末梢側で一旦大動脈外にグラフトを出しそのループの頂点部を転位縫着した人工弁の末梢側で大動脈(弁付き人工血管の場合は人工血管)と側側に吻合する方法を行った．術後経過は順調で，狭心症，不整脈は発生していない．